

Application No. 10/042,357

REMARKS

The Examiner's rejection of the claims over the prior art under 35 U.S.C. 103(a), reference page 2 of the Official Action, is respectfully traversed.

It is not believed that the Examiner has established a prima facie case of obviousness as confirmed by the Examiner's comments on page 3, first paragraph, of the Official Action, and moreover, the Examiner has not provided to Applicants specific basis in the reference or other basis, particularly without the benefit of the teachings of the present application, as to why the polythiophenes of the present invention as recited, for example, in Claim 1, now cancelled, would be obvious.

Referring now, more specifically, to the Chemical Abstract reference 136: 6729 or 135: 107684 or 135: 46558, while these references illustrate the synthesis and characteristics of polythiophenes, the Examiner has not established how the claims of the present application being rejected, such as Claim 2, encompass the polythiophenes of the aforementioned prior art. Moreover, it is important to note that the polythiophenes are doped with copper (2 perchlorate) and in this regard, the listed inventor Dr. Beng Ong has confirmed that these polymers would thus be conductive and thus would not function, for example, or function in an acceptable manner as compared to the semiconductive polythiophenes of the present application; see, for example, page 5, beginning at line 12, of the present application wherein the polythiophene layer has a conductivity of from about  $10^{-6}$  to about  $10^{-9}$  S/cm (Siemens/centimeter) and which range is known to be for semiconductive materials and not conductive materials as confirmed by Dr. Beng Ong, one of the listed inventors. Moreover, Dr. Ong emphasizes that the polythiophenes of the reference being relied upon by the Examiner are conductive and that the formulas of the polythiophenes of Claim 2 do not encompass the specific polythiophenes of the Chemical Abstract references, see for example page

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50, the formula for the polymer with an n, or page 57 of 135: 107684; it being noted that the other components are monomers, reference the formula in the middle of this abstract. The only polymer illustrated is at the bottom of page 50 and a review of this formula in comparison to the formula of Claim 2 readily reveals a number of differences including the presence of two R side chains on the polythiophenes of Claim 2. Similar comments are applicable to the other Chemical Abstract references and to Garnier et al. of record. Note, for example, that a number of monomers are illustrated in the 135: 107684 Chemical Abstract reference and the 135: 46558 Chemical Abstract reference with the only polymer being, for example, on page 57 which has an n repeating unit thereof. While the Garnier et al. reference illustrates organic semiconductors, it is important to note from the title thereof that these materials are oligomers, that is they are not polymers in the context of the present invention as recited in Claim 2. In summary, these are small molecules, not polymers, and they will behave substantially differently than polymers, and their performance as thin film transistors will be very poor or unacceptable based on a review of this reference in conjunction with other prior art and as confirmed by Dr. Ong, one of the listed inventors.

Concerning the process claims, similar comments as recited herein are applicable, and in this regard it is believed that if it is determined that the polythiophenes are patentable then the process of preparing these phthalocyanines should also be patentable. Accordingly, for the present response Applicants will rely on the aforementioned, reference a number of CAFC and Board of Appeals decisions.

Further, the Examiner is referred to the lab Examples and particularly the Comparative Examples beginning on page 32 of the present application wherein a series of comparative thin film transistors were fabricated with the known polythiophene P3HT which is disclosed in the prior art and the data provided with respect to mobility beginning at the bottom of

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page 32, line 25, and the comments interpreting this data on page 33, lines 1 to 6.

The nonstatutory double patenting rejection is respectfully traversed since the Examiner has not established a sufficient relationship between the claims of the present application and those of copending applications 10/042,359 and 10/042,360, respectively. Nevertheless, Applicants are submitting in accordance with the Examiner's suggestion a Terminal Disclaimer whereby any patent issuing from the present application will expire simultaneously with those patents issuing from the aforementioned two copending applications.

Therefore, it is respectfully urged that the Examiner reconsider his positions and allow the present application.

While particular embodiments have been described, alternatives, modifications, variations, improvements, and substantial equivalents that are or may be presently unforeseen may arise to applicants or others skilled in the art. Accordingly, the appended claims as filed and as they may be amended are intended to embrace all such alternatives, modifications variations, improvements, and substantial equivalents.

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In the event the Examiner considers personal contact advantageous to the disposition of this case, he is hereby authorized to call Eugene O. Palazzo, at Telephone Number 585-423-4687, Rochester, New York.

Respectfully submitted,



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EOP/jah

July 9, 2003

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**VERSION WITH MARKINGS TO SHOW CHANGES MADE:**

**IN THE SPECIFICATION:**

Page 1, line 6:

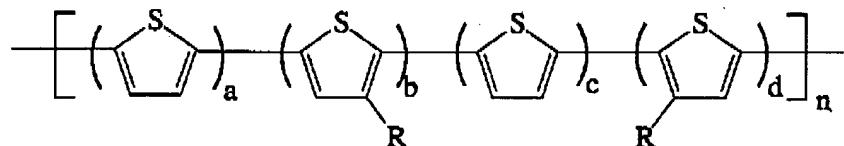
Illustrated in copending applications U.S. Serial No. [(not yet assigned - D/A1333)] 10/042,342, U.S. Serial No. [(not yet assigned - D/A1334)] 10/042,356, U.S. Serial No. [(not yet assigned - D/A1332)] 10/042,358, U.S. Serial No. [(not yet assigned - D/A1657)] 10/042,359, U.S. Serial No. [(not yet assigned - D/A1658)] 10/042,360, the disclosures of which are totally incorporated herein by reference, and filed concurrently herewith, all titled "Polythiophenes and Devices Thereof" and all filed January 11, 2002, are polythiophenes and devices thereof. The appropriate components, processes thereof and uses thereof illustrated in these copending applications may be selected for the present invention in embodiments thereof.

**IN THE CLAIMS:**

Claim 1 is cancelled.

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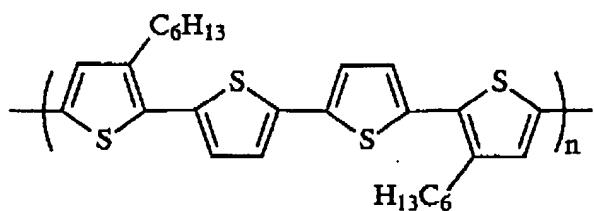
2. (Amended) Polythiophenes [in accordance with claim 1 and which polythiophenes are represented by] of the formula



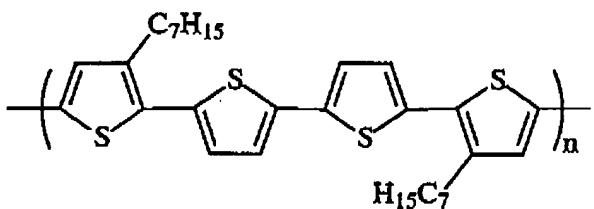
wherein R is a side chain; a is an integer of from about 0 to about 5; b, c, and d are integers of from about 1 to about 5; and n represents the degree of polymerization of from about 5 to about 5,000; the number average molecular weight ( $M_n$ ) of the polythiophenes is from about 2,000 to about 100,000, and the weight average molecular weight ( $M_w$ ) is from about 4,000 to about 500,000, each measured by gel permeation chromatography using polystyrene standards, and wherein said polythiophenes possess a conductivity of from about  $10^{-6}$  to about  $10^{-9}$ /S/cm.

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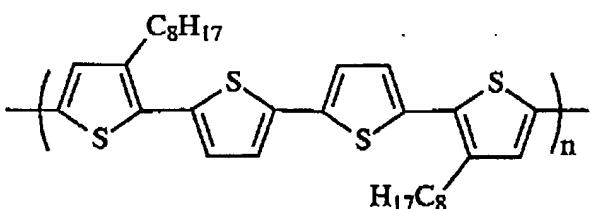
3. (Amended) Polythiophenes in accordance with claim [1]  
2 and of the formulas



(II-a)

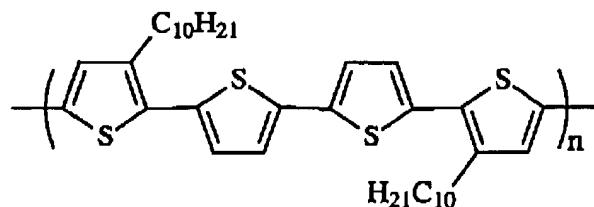


(II-b)

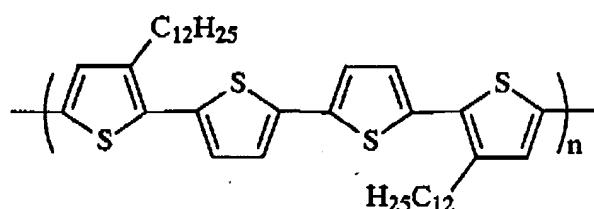


(II-c)

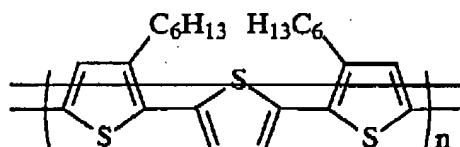
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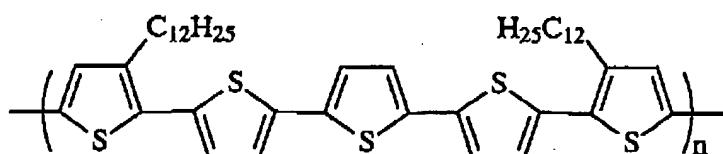
(II-d)



(II-e)

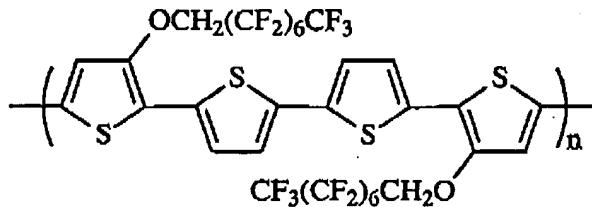


(II-f)

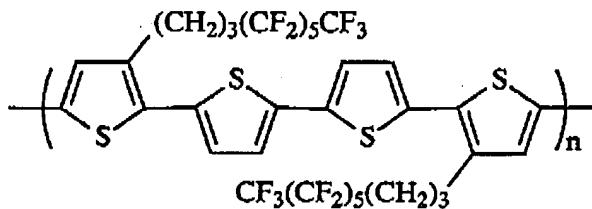


(II-g)

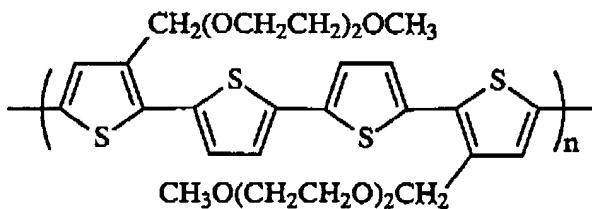
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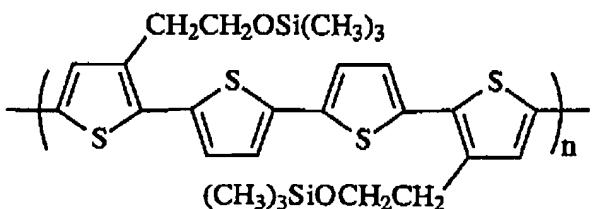
(II-h)



(II-i)

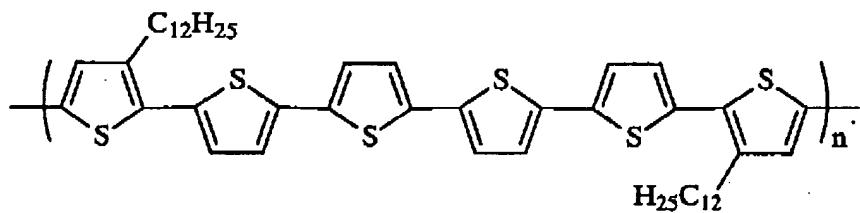


(II-j)

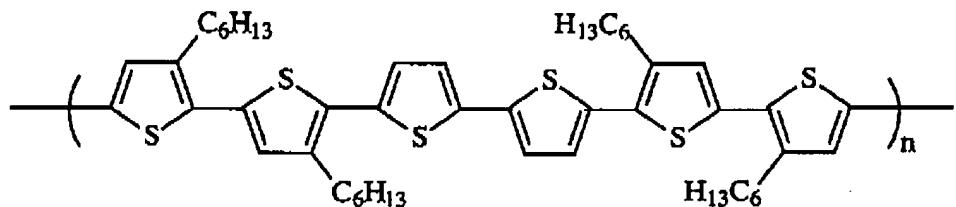


(II-k)

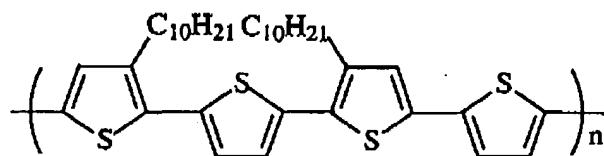
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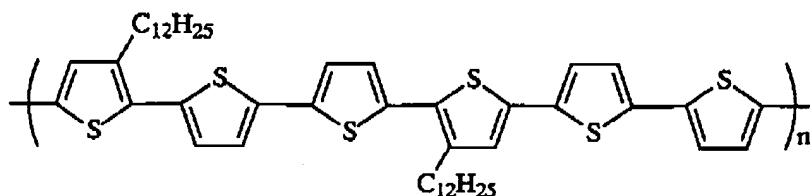
(II-l)



(II-m)



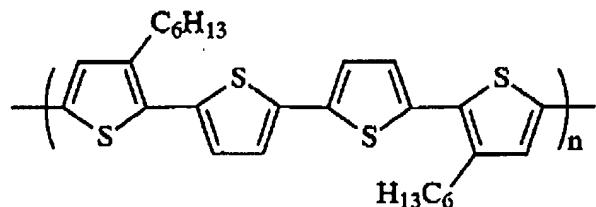
(II-n)



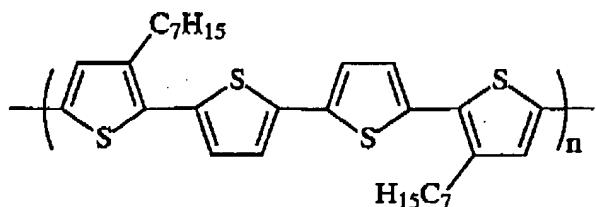
(II-o)

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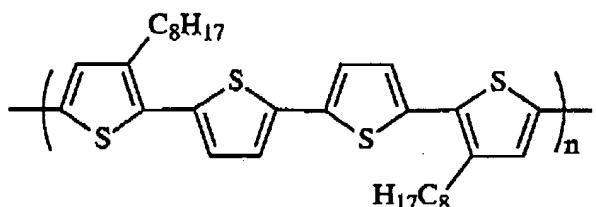
4. (Amended) Polythiophenes in accordance with claim [1] 2 and of the formulas



(II-a)

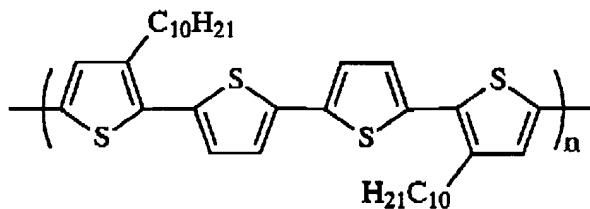


(II-b)

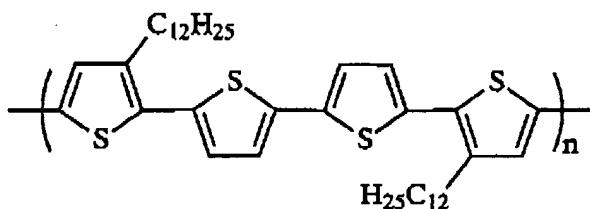


(II-c)

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(II-d)



(II-e)

5. (Amended) Polythiophenes in accordance with **claim [1]**  
2 wherein m is 1.

6. (Amended) Polythiophenes in accordance with **claim [1]**  
2 wherein R is alkoxyalkyl, siloxy substituted alkyl, a perhaloalkyl, or a polyether.

7. (Amended) Polythiophenes in accordance with **claim [1]**  
2 wherein A is an arylene.

11. (Amended) Polythiophenes in accordance with **claim [1]**  
2 wherein m is 1 or 2.

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12. (Amended) Polythiophenes in accordance with claim [1]  
2 wherein x, y, and z represent the number of segments of from 1 to about 5  
for x and y, and z is zero (0) or 1.

13. (Amended) Polythiophenes in accordance with claim [1]  
2 wherein n is from about 5 to about 5,000; the number average molecular  
weight ( $M_n$ ) of the polythiophene is from about 2,000 to about 100,000; the  
weight average molecular weight ( $M_w$ ) is from about 4,000 to over 500,000,  
both  $M_w$  and  $M_n$  being measured by gel permeation chromatography using  
polystyrene standards.

14. (Amended) Polythiophenes in accordance with claim [1]  
2 wherein R is alkyl containing from 1 to about 20 carbon atoms; wherein n is  
from about 10 to about 1,000; the  $M_n$  is from about 4,000 to about 50,000; and  
the  $M_w$  is from about 5,000 to about 100,000.

15. (Amended) Polythiophenes in accordance with claim [1]  
2 wherein the alkyl side chain R contains from about 6 to about 12 carbon  
atoms.

16. (Amended) Polythiophenes in accordance with claim [1]  
2 wherein the alkyl side chain R is butyl, pentyl, hexyl, heptyl, octyl, nonyl,  
decyl, undecyl, or dodecyl.

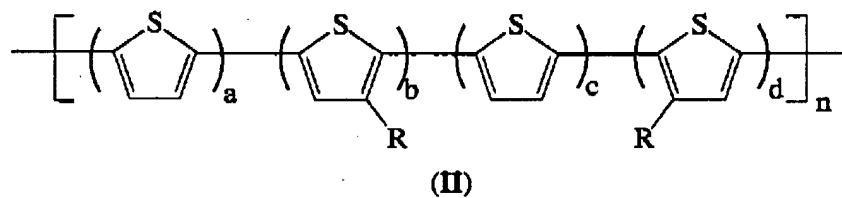
17. (Amended) Polythiophenes in accordance with claim [1]  
2 wherein the side chain R is a perfluoroalkyl of about 2 to about 15 carbon  
atoms.

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18. (Amended) Polythiophenes in accordance with **claim [1]**  
**2** wherein the side chain R is siloxyalkyl of trimethylsiloxyalkyl or triethylsiloxyalkyl, and wherein alkyl optionally contains from about 4 to about 10 carbons, and which alkyl is butyl, pentyl, hexyl, heptyl, or octyl.

19. (Amended) Polythiophenes in accordance with **claim [1]**  
**2** wherein the divalent linkage A is an arylene with from about 6 to about 40 carbon atoms.

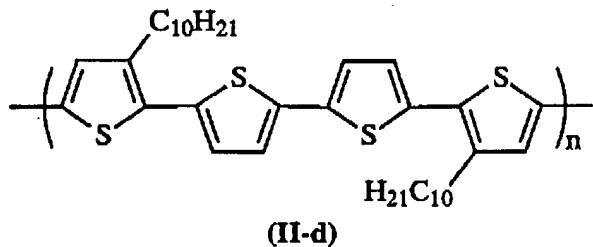
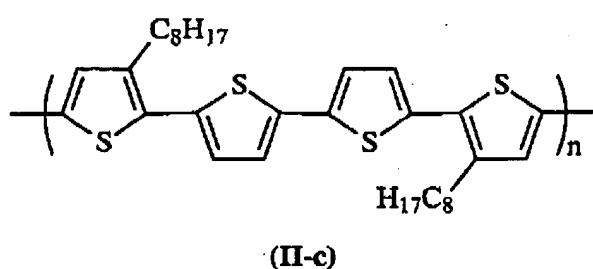
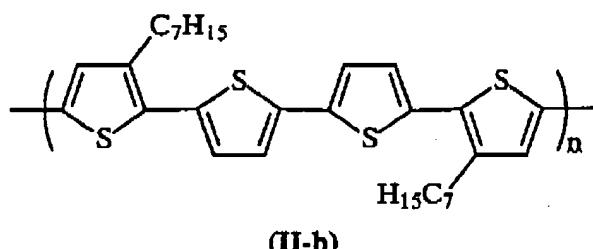
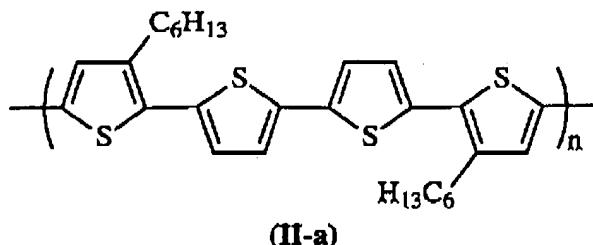
21. (Amended) Polythiophenes in accordance with **claim [1]**  
**2** and wherein n is [represented by



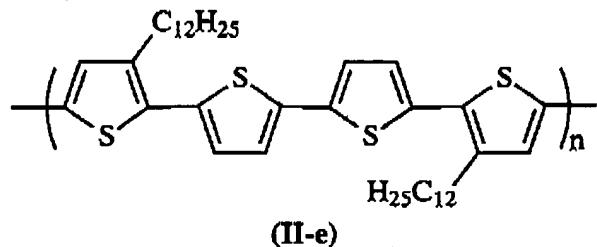
wherein R is a side chain; a, b, c, and d represent the number of thiénylene moieties; and n is the degree of polymerization of] from about 100 to about 1,000.

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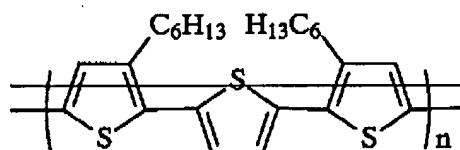
27. (Amended) Polythiophenes in accordance with claim [1]  
2 wherein said polythiophene is selected from the group consisting of polythiophenes (II-a) through [(II-o)] (II-e) and (II-g), and wherein n is from about 100 to about 4,000



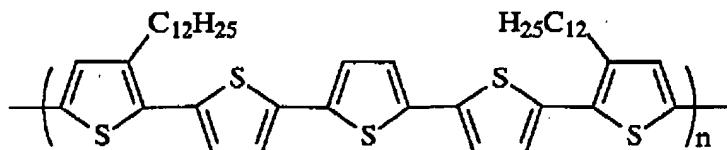
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(II-e)



(II-f)



(II-g)